

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 0 804 536 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:

12.01.2000 Bulletin 2000/02

(21) Application number: **95926772.5**

(22) Date of filing: **21.07.1995**

(51) Int Cl.7: **C11D 3/43**, C11D 3/37

(86) International application number:
PCT/US95/09273

(87) International publication number:
WO 96/04358 (15.02.1996 Gazette 1996/08)

(54) **GLASS CLEANER COMPOSITIONS**

GLASREINIGUNGSMITTEL

COMPOSITIONS POUR NETTOYER LE VERRE

(84) Designated Contracting States:

**AT BE CH DE DK ES FR GB GR IE IT LI LU NL PT
SE**

(30) Priority: **02.08.1994 US 284778**
25.01.1995 US 378205

(43) Date of publication of application:
05.11.1997 Bulletin 1997/45

(73) Proprietor: **THE PROCTER & GAMBLE COMPANY**
Cincinnati, Ohio 45202 (US)

(72) Inventors:

- **MASTERS, Ronald, Anthony**
Loveland, OH 45140 (US)
- **MAILE, Michael, Stephen**
Maineville, OH 45039 (US)

(74) Representative: **Engisch, Gautier et al**
Procter & Gamble
European Technical Center N.V.
Temselaan 100
1853 Strombeek-Bever (BE)

(56) References cited:

EP-A- 0 527 625	EP-A- 0 590 722
EP-A- 0 595 383	EP-A- 0 630 965
WO-A-91/00332	AU-A- 458 526
GB-A- 2 193 505	US-A- 3 591 509
US-A- 4 606 842	

- **HAPPI HOUSEHOLD AND PERSONAL
PRODUCTS INDUSTRY**, vol. 31, no. 12, 1
December 1994 page 104, 106, 108 XP 000472861
**GUTH J ET AL 'MULTIFUNCTIONAL
SULFONATED POLYMERS FOR HOUSEHOLD
APPLICATIONS'**
- **DATABASE WPI Derwent Publications Ltd.,**
London, GB; AN 89-036140 & JP,A,63 309 596
(LION CORP) , 16 December 1988

Remarks:

The file contains technical information submitted
after the application was filed and not included in this
specification

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

EP 0 804 536 B1

Description**FIELD OF THE INVENTION**

[0001] This invention pertains to glass cleaning compositions, preferably liquid detergent compositions for use in cleaning glass, especially window glass, and, preferably, other hard surfaces. Such compositions typically contain detergent surfactants, solvents, builders, etc.

BACKGROUND OF THE INVENTION

[0002] The use of, e.g. solvents and organic water-soluble synthetic detergent surfactants at low levels for cleaning glass are known. There are several compositions known that provide good filming/streaking characteristics so that the glass is cleaned without leaving objectionable levels of spots and/or films. Known detergent compositions comprise certain organic solvents, detergent surfactants, and optional builders and/or abrasives. The prior art, however, fails to teach, or recognize, the advantage of providing an additional material in glass cleaner formulations to provide a residual hydrophilicity.

[0003] US 4,606,842 discloses aqueous compositions for cleaning glass and similar hard-surfaces comprising an alcohol, a higher boiling polar organic solvent, at least one surfactant selected from the group consisting of water-soluble anionic and non-ionic surfactants, and a polyacrylic resin having a molecular weight of from 500 to 8000.

[0004] EP-A-527 625 discloses glass cleaning compositions, having a pH of from 3.5 to 11.5, comprising ethylene glycol ether, an anionic, nonionic, amphoteric or zwitterionic surfactant, one or more organic cosolvents. A composition, which further comprises a low molecular weight polyacrylic acid resin is exemplified.

[0005] AU 458.526 discloses cleaning compositions for glass and reflective surfaces comprising a lower alcohol, a water miscible glycol ether, a soluble polymeric salt, and a nonionic or anionic surfactant. However, compositions having an alkaline pH are not exemplified.

[0006] EP-A-590 722 discloses hard-surface detergent compositions, having a pH of from 3 to 11.5, comprising a propylene glycol/ethylene glycol block copolymer nonionic detergent surfactant. The composition may further comprise a hydrophobic solvent, a surfactant selected from the group consisting of anionic and zwitterionic surfactants, an alkanolamine.

[0007] US 3,591,509 discloses liquid hard-surface cleaning compositions comprising a surfactant selected from the group consisting of anionic, nonionic and zwitterionic surfactants, a watersoluble builder, an organic solvent, and a water-soluble carboxymethylcellulose. However, compositions comprising an alkanolamine as a buffer-alkalinity source are not disclosed.

[0008] JP-A-63309596 discloses a liquid detergent composition used in dishwashing comprising an anionic, a non-ionic and an amphoteric surfactant, polystyrene sulphonic acid and ethanol.

[0009] HAPPI, VOL.31, NO.12, P.104, 106, 108, Dec.1994, discloses household cleaner compositions comprising a sulfonated polystyrene, a nonionic surfactant, ammonium hydroxide, isopropanol and water. However, compositions comprising a hydrophobic solvent, and an alkanolamine as a buffer-alkalinity-source are not disclosed.

[0010] The preferred liquid cleaning compositions have the great advantage that they can be applied to hard surfaces in neat or concentrated form so that a relatively high level of, e.g. surfactant material and/or organic solvent is delivered directly to the soil. Therefore, liquid cleaning compositions have the potential to provide superior soap scum, grease, and oily removal over dilute wash solutions prepared from powdered cleaning compositions. The most preferred compositions are those that provide good cleaning on tough soils and yet clean glass without leaving objectionable levels of spots and/or films.

[0011] The inclusion of detergent builders in liquid hard surface cleaning compositions increases the potential to provide superior cleaning. However, in the past, the inclusion of such detergent builders has usually produced unacceptable results for filming/streaking. The inclusion of detergent builders has therefore been considered a compromise in favor of cleaning.

Liquid cleaning compositions, and especially compositions prepared for cleaning glass, need exceptionally good filming/streaking properties. In addition, they can suffer problems of product form, in particular, inhomogeneity, lack of clarity, or excessive "solvent" odor for consumer use.

SUMMARY OF THE INVENTION

[0012] The present invention relates to detergent compositions as defined in claim 1 that can clean glass without leaving objectionable levels of filming and/or streaking and which contain an effective amount of substantive material which provides the glass, especially window glass, with long lasting higher hydrophilicity. The compositions are in the form of an aqueous, liquid, hard surface detergent composition having improved cleaning and good spotting charac-

teristics after rewetting. The compositions can be formulated at usage concentrations, or as concentrates, and can be packaged in a container having means for creating a spray to make application to hard surfaces more convenient.

[0013] All percentages, parts, and ratios herein are "by weight" and all amounts are approximations, unless otherwise stated.

DETAILED DESCRIPTION OF THE INVENTION

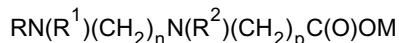
[0014] In accordance with the present invention, it has been found that superior detergent compositions for cleaning shiny surfaces such as glass which leave said surface with a desirable appearance, i.e., without objectionable levels of filming and/or streaking, can be further improved to help maintain said desirable appearance for an extended period of time by incorporating a material that is substantive to said surfaces and which provides a more hydrophilic surface. When such surfaces are rewetted, e.g., as when windows are wetted by rain, the water "sheets" off the surface and the surface is still without objectionable levels of spotting (and/or filming) after the surface dries preferably providing said anti-spatting/filming effects for at least three rewetting cycles. As anyone who has cleaned windows can attest, one of the most frustrating things that can happen after windows have been cleaned is for a rain shower to occur and leave spots on the just cleaned window. The present invention meets a long felt need. The aqueous liquid detergent compositions for cleaning shiny surfaces such as glass are defined in claim 1.

(A) THE DETERGENT SURFACTANT

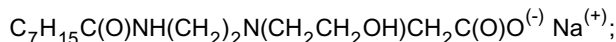
(1) The Amphocarboxylate Detergent Surfactant

[0015] The aqueous, liquid hard surface detergent compositions (cleaners) herein can contain from 0.001% to 1%, preferably from 0.01% to 0.5%, more preferably from 0.02% to 0.2%, and even more preferably from 0.03% to 0.08%, of C₆₋₁₀ short chain amphocarboxylate detergent surfactant. It has been found that these amphocarboxylate, and, especially glycinate, detergent surfactants provide good cleaning with superior filming/streaking for detergent compositions that are used to clean both glass and/or relatively hard-to-remove soils. Despite the short chain, the detergency is good and the short chains provide improved filming/streaking, even as compared to most of the zwitterionic detergent surfactants described hereinafter. Depending upon the level of cleaning desired and/or the amount of hydrophobic material in the composition that needs to be solubilized, one can either use only the amphocarboxylate detergent surfactant, or can combine it with cosurfactant, preferably said zwitterionic surfactants.

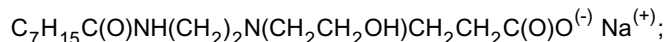
[0016] The "amphocarboxylate" detergent surfactants herein have the generic formula:



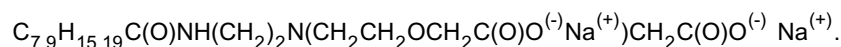
wherein R is a C₆₋₁₀ hydrophobic moiety, typically a fatty acyl moiety containing from about 6 to about 10 carbon atoms which, in combination with the nitrogen atom forms an amido group, R¹ is hydrogen (preferably) or a C₁₋₂ alkyl group, R² is a C₁₋₃ alkyl or, substituted C₁₋₃ alkyl, e.g., hydroxy substituted or carboxy methoxy substituted, preferably, hydroxy ethyl, each n is an integer from 1 to 3, each p is an integer from 1 to 2, preferably 1, and each M is a water-soluble cation, typically an alkali metal, ammonium, and/or alkanolammonium cation. Such detergent surfactants are available, for example: from Witco under the trade name Rewoteric AM-V®, having the formula



Mona Industries, under the trade name Monateric 1000®, having the formula



and Lonza under the trade name Amphoterger KJ-2®, having the formula

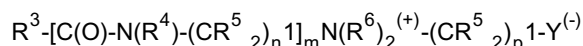


(2) Zwitterionic Detergent Surfactant

[0017] The aqueous, liquid hard surface detergent compositions (cleaners) herein can contain from 0.02% to 5% of zwitterionic detergent surfactant containing a quaternary ammonium group, and a carboxylate and/or sulfonate group, preferably sulfonate. A more preferred range of zwitterionic detergent surfactant inclusion is from 0.05% to 0.2%.

[0018] Zwitterionic detergent surfactants, as mentioned hereinbefore, contain both a cationic group and an anionic group and are in substantial electrical neutrality where the number of anionic charges and cationic charges on the detergent surfactant molecule are substantially the same. Zwitterionic detergents, which typically contain both a quaternary ammonium group and an anionic group selected from sulfonate and carboxylate groups are desirable since they maintain their amphoteric character over most of the pH range of interest for cleaning hard surfaces. The sulfonate group is the preferred anionic group.

[0019] The zwitterionic detergent surfactants herein have the generic formula:



wherein each Y is preferably a carboxylate (COO⁻) or sulfonate (SO₃⁻) group, more preferably sulfonate; wherein each R³ is a hydrocarbon, e.g., an alkyl, or alkylene, group containing from 8 to 20, preferably from 10 to 18, more preferably from 12 to 16 carbon atoms; wherein each (R⁴) is either hydrogen, or a short chain alkyl, or substituted alkyl, containing from one to about four carbon atoms, preferably groups selected from the group consisting of methyl, ethyl, propyl, hydroxy substituted ethyl or propyl and mixtures thereof, preferably methyl; wherein each (R⁵) is selected from the group consisting of hydrogen and hydroxy groups with no more than one hydroxy group in any (CR⁵)₂p¹ group; wherein (R⁶) is like R⁴ except preferably not hydrogen more preferably each R⁶ is methyl; wherein m is 0 or 1; and wherein each n¹ and p¹ are an integer from 1 to 4, preferably from 2 to 3, more preferably 3. The R³ groups can be branched, unsaturated, or both and such structures can provide filming/streaking benefits, even when used as part of a mixture with straight chain alkyl R³ groups. The R⁴ groups can also be connected to form ring structures such as imidazoline, pyridine, etc. Preferred hydrocarbyl amidoalkylene sulfobetaine (HASB) detergent surfactants wherein m = 1 and Y is a sulfonate group provide superior grease soil removal and/or filming/streaking and/or "anti-fogging" and/or perfume solubilization properties. Such hydrocarbylamidoalkylene sulfobetaines, and, to a lesser extent hydrocarbylamidoalkylene betaines are excellent for use in hard surface cleaning detergent compositions, especially those formulated for use on both glass and hard-to-remove soils. They are even better when used with monoethanolamine and/or specific beta-amino alkanol as disclosed herein.

[0020] A more preferred specific detergent surfactant is a C₁₀₋₁₄ fatty acylamidopropylene(hydroxypropylene)sulfobetaine, e.g., the detergent surfactant available from the Witco Company as a 40% active product under the trade name "REWOTERIC AM CAS Sulfobetaine®."

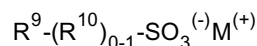
[0021] The level of zwitterionic detergent surfactant, e.g., HASB, in the composition is from 0.02% to 5%, preferably from 0.05% to 5%. The level in the composition is dependent on the eventual level of dilution to make the wash solution. For glass cleaning, the composition, when used full strength, or wash solution containing the composition, should contain from 0.02% to 1%, preferably from 0.05% to 0.5%, more preferably from 0.05% to 0.25%, of detergent surfactant. For removal of difficult to remove soils like grease, the level can, and should be, higher, typically from 0.1% to 5%, preferably from 0.25% to 2%. Concentrated products will typically contain from 0.2% to 5%, preferably from 0.3% to 5%. It is an advantage of the zwitterionic detergent, e.g., HASB, that compositions containing it can be more readily diluted by consumers since it does not interact with hardness cations as readily as conventional anionic detergent surfactants. Zwitterionic detergents are also extremely effective at very low levels, e.g., below 1%.

[0022] Commercial sources of such surfactants can be found in McCutcheon's EMULSIFIERS AND DETERGENTS, North American Edition, 1984, McCutcheon Division, MC Publishing Company.

(3) Anionic and Optional Nonionic Detergent Surfactant

[0023] The aqueous, liquid hard surface detergent compositions, herein can contain, as the primary detergent surfactant, less preferred, or as the cosurfactant, from 0.01% to 1.0% of suitable anionic detergent surfactant. The anionic surfactants are water-soluble alkyl or alkylaryl compounds, the alkyl having from 6 to 20 carbons, and including a sulfate or sulfonate substituent group. Depending upon the level of cleaning desired one can use only the anionic detergent surfactant, or more preferably the anionic detergent surfactant can be combined with a cosurfactant, preferably an amphoteric cosurfactant. Nonionic surfactants, e.g., ethoxylated alcohols and/or alkyl phenols, can also be used as cosurfactants.

[0024] The anionic detergent surfactants herein have the generic formula:

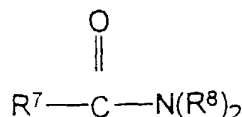


wherein R^9 is a C_6 - C_{20} alkyl chain, preferably a C_8 - C_{16} alkyl chain; R^{10} , when present, is a C_6 - C_{20} alkylene chain, preferably a C_8 - C_{16} alkylene chain, a C_6H_4 phenylene group, or O; and M is the same as before.

[0025] The patents and references disclosed hereinbefore also disclose other detergent surfactants, e.g., anionic, and, less preferably, nonionic detergent surfactants, that can be used in small amounts, preferably as cosurfactants for the preferred amphoteric/zwitterionic detergent surfactant, the cosurfactant level being small in relation to the primary surfactant. Typical of these are the alkyl- and alkylethoxylate- (polyethoxylate) sulfates, paraffin sulfonates, olefin sulfonates, alkoxyated (especially ethoxylated) alcohols and alkyl phenols, alkyl phenol sulfonates, alpha-sulfonates of fatty acids and of fatty acid esters, and the like, which are well-known from the detergency art. When the pH is above 9.5, detergent surfactants that are amphoteric at a lower pH are desirable anionic detergent cosurfactants. For example, detergent surfactants which are C_{12} - C_{18} acylamido alkylene amino alkylene sulfonates, e.g., compounds having the formula $R-C(O)-NH-(C_2H_4)-N(C_2H_4OH)-CH_2CH(OH)CH_2SO_3M$ wherein R is an alkyl group containing from about 9 to about 18 carbon atoms and M is a compatible cation are desirable cosurfactants. These detergent surfactants are available as Miranol® CS, OS, JS, etc. The CTFA adopted name for such surfactants is cocoamphohydroxypropyl sulfonate. It is preferred that the compositions be substantially free of alkyl naphthalene sulfonates.

[0026] In general, detergent surfactants useful herein contain a hydrophobic group, typically containing an alkyl group in the C_9 - C_{18} range, and, optionally, one or more linking groups such as ether or amido, preferably amido groups. The anionic detergent surfactants can be used in the form of their sodium, potassium or alkanolammonium, e.g., triethanolammonium salts; the nonionics, not preferred, generally contain from 5 to 17 ethylene oxide groups. C_{12} - C_{18} paraffin-sulfonates and alkyl sulfates are especially preferred anionic detergent surfactants in the compositions of the present type.

[0027] Some suitable surfactants for use herein in small amounts are one or more of the following: sodium linear C_8 - C_{18} alkyl benzene sulfonate (LAS), particularly C_{11} - C_{12} LAS; the sodium salt of a coconut alkyl ether sulfate containing 3 moles of ethylene oxide; the adduct of a random secondary alcohol having a range of alkyl chain lengths of from 11 to 15 carbon atoms and an average of 2 to 10 ethylene oxide moieties several commercially available examples of which are Tergitol® 15-S-3, Tergitol® 15-S-5, Tergitol® 15-S-7, and Tergitol® 15-S-9, all available from Union Carbide Corporation; the sodium and potassium salts of coconut fatty acids (coconut soaps); the condensation product of a straight-chain primary alcohol containing from 8 carbons to 16 carbon atoms and having an average carbon chain length of from 10 to 12 carbon atoms with from 4 to 8 moles of ethylene oxide per mole of alcohol; an amide having one of the preferred formulas:



wherein R^7 is a straight-chain alkyl group containing from 7 to 15 carbon atoms and having an average carbon chain length of from 9 to 13 carbon atoms and wherein each R^8 is a hydroxy alkyl group containing from 1 to 3 carbon atoms; a zwitterionic surfactant having one of the preferred formulas set forth hereinafter; or a phosphine oxide surfactant. Another suitable class of surfactants is the fluorocarbon surfactants, examples of which are FC-129®, a potassium fluorinated alkylcarboxylate and FC-170-C®, a mixture of fluorinated alkyl polyoxyethylene ethanols, both available from 3M Corporation, as well as the Zonyl® fluorosurfactants, available from DuPont Corporation. It is understood that mixtures of various surfactants can be used.

(4) Mixtures

[0028] Mixtures of amphocarboxylate, zwitterionic detergent surfactants, and/or anionic detergent surfactants as discussed hereinbefore, can be present in the present invention. The zwitterionic detergent surfactants can be present at levels from 0.02% to 5%. The amphocarboxylate detergent surfactants can be present at levels from 0.001% to 1%. The ratio of zwitterionic detergent surfactant to amphocarboxylate detergent surfactant is typically from 3:1 to 1:3, preferably from 2:1 to 1:2, more preferably 1:1. The ratio of primary detergent surfactant to cosurfactant, or cosurfactants, is typically from 3:1 to 1:1.

B. HYDROPHOBIC SOLVENT

[0029] In order to improve cleaning in liquid compositions, one can use a hydrophobic solvent that has cleaning activity. The solvents employed in the hard surface cleaning compositions herein can be any of the well-known "de-greasing" solvents commonly used in, for example, the dry cleaning industry, in the hard surface cleaner industry and the metalworking industry.

[0030] A useful definition of such solvents can be derived from the solubility parameters as set forth in "The Hoy," a publication of Union Carbide, incorporated herein by reference. The most useful parameter appears to be the hydrogen bonding parameter which is calculated by the formula:

$$\gamma_H = \gamma_T \left[\frac{a - 1}{a} \right]^{1/2}$$

wherein γ_H is the hydrogen bonding parameter, a is the aggregation number,

$$(\text{Log } \alpha = 3.39066 T_b/T_c - 0.15848 - \text{Log } \frac{M}{d}),$$

and

γ_T is the solubility parameter which is obtained from the formula:

$$\gamma_T = \left[\frac{(\Delta H_{25} - RT)d}{M} \right]^{1/2}$$

where ΔH_{25} is the heat of vaporization at 25°C, R is the gas constant (1.987 cal/mole/deg), T is the absolute temperature in °K, T_b is the boiling point in °K, T_c is the critical temperature in °K, d is the density in g/ml, and M is the molecular weight.

[0031] For the compositions herein, hydrogen bonding parameters are preferably less than 7.7, more preferably from about 2 to 7, or 7.7, and even more preferably from 3 to 6. Solvents with lower numbers become increasingly difficult to solubilize in the compositions and have a greater tendency to cause a haze on glass. Higher numbers require more solvent to provide good greasy/oily soil cleaning.

[0032] Hydrophobic solvents are typically used at a level of from 0.5% to 30%, preferably from 2% to 15%, more preferably from 3% to 8%. Dilute compositions typically have solvents at a level of from 1% to 10%, preferably from 3% to 6%. Concentrated compositions contain from 10% to 30%, preferably from 10% to 20% of solvent.

[0033] Many of such solvents comprise hydrocarbon or halogenated hydrocarbon moieties of the alkyl or cycloalkyl type, and have a boiling point well above room temperature, i.e., above 20°C.

[0034] The formulator of compositions of the present type will be guided in the selection of cosolvent partly by the need to provide good grease-cutting properties, and partly by aesthetic considerations. For example, kerosene hydrocarbons function quite well for grease cutting in the present compositions, but can be malodorous. Kerosene must be exceptionally clean before it can be used, even in commercial situations. For home use, where malodors would not be tolerated, the formulator would be more likely to select solvents which have a relatively pleasant odor, or odors which can be reasonably modified by perfuming.

[0035] The C₆-C₉ alkyl aromatic solvents, especially the C₆-C₉ alkyl benzenes, preferably octyl benzene, exhibit excellent grease removal properties and have a low, pleasant odor. Likewise, the olefin solvents having a boiling point of at least about 100°C, especially alpha-olefins, preferably 1-decene or 1-dodecene, are excellent grease removal solvents.

[0036] Generically, glycol ethers useful herein have the formula R¹¹ O-(R¹²O-)_m1H wherein each R¹¹ is an alkyl group which contains from 3 to 8 carbon atoms, each R¹² is either ethylene or propylene, and m¹ is a number from 1

to 3. The most preferred glycol ethers are selected from the group consisting of monopropyleneglycolmonopropyl ether, dipropyleneglycolmonobutyl ether, monopropyleneglycolmonobutyl ether, ethyleneglycolmonoethyl ether, ethyleneglycolmonobutyl ether, diethyleneglycolmonoethyl ether, monoethyleneglycolmonoethyl ether, monoethyleneglycolmonobutyl ether, and mixtures thereof.

[0037] A particularly preferred type of solvent for these hard surface cleaner compositions comprises diols having from 6 to 16 carbon atoms in their molecular structure. Preferred diol solvents have a solubility in water of from 0.1 to 20 g/100 g of water at 20°C.

[0038] Solvents such as pine oil, orange terpene, benzyl alcohol, n-hexanol, phthalic acid esters of C₁₋₄ alcohols, butoxy propanol, Butyl Carbitol® and 1(2-n-butoxy-1-methylethoxy)propane-2-ol (also called butoxy propoxy propanol or dipropylene glycol monobutyl ether), hexyl diglycol (Hexyl Carbitol®), butyl triglycol, diols such as 2,2,4-trimethyl-1,3-pentanediol, and mixtures thereof, can be used. The butoxy-propanol solvent should have no more than 20%, preferably no more than 10%, more preferably no more than 7%, of the secondary isomer in which the butoxy group is attached to the secondary atom of the propanol for improved odor.

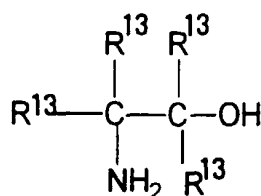
C. ALKALINITY SOURCE

[0039] The aqueous liquid hard surface compositions can contain herein from 0.05% to 10%, by weight of the composition, of alkaline material, comprising or consisting of, monoethanolamine and/or beta-aminoalkanol containing from 3-6 C atoms.

[0040] Monoethanolamine and/or beta-aminoalkanol compounds serve primarily as solvents when the pH is above 10, and especially above 10.7. They also provide alkaline buffering capacity during use. However, the most unique contribution they make is to improve the filming/streaking properties of hard surface cleaning compositions containing zwitterionic detergent surfactant, amphocarboxylate detergent surfactant, or mixtures thereof, whereas they do not provide any substantial improvement in filming/streaking when used with conventional anionic or ethoxylated nonionic detergent surfactants. The reason for the improvement is not known. It is not simply a pH effect, since the improvement is not seen with conventional alkalinity sources. Other similar materials that are solvents do not provide the same benefit and the effect can be different depending upon the other materials present. When perfumes that have a high percentage of terpenes are incorporated, the benefit is greater for the beta-alkanolamines, and they are often preferred, whereas the monoethanolamine is usually preferred.

[0041] Monoethanolamine and/or beta-alkanolamine are used at a level of from 0.05% to 10%, preferably from 0.2% to 5%. For dilute compositions they are typically present at a level of from 0.05% to 2%, preferably from 0.1% to 1.0%, more preferably from 0.2% to 0.7%. For concentrated compositions they are typically present at a level of from 0.5% to 10%, preferably from 1% to 5%.

[0042] Preferred beta-aminoalkanols have a primary hydroxy group. Suitable beta-aminoalkanols have the formula:



wherein each R¹³ is selected from the group consisting of hydrogen and alkyl groups containing from one to four carbon atoms and the total of carbon atoms in the compound is from three to six, preferably four. The amine group is preferably not attached to a primary carbon atom. More preferably the amine group is attached to a tertiary carbon atom to minimize the reactivity of the amine group. Specific preferred beta-aminoalkanols are 2-amino, 1-butanol; 2-amino, 2-methylpropanol; and mixtures thereof. The most preferred beta-aminoalkanol is 2-amino,2-methylpropanol since it has the lowest molecular weight of any beta-aminoalkanol which has the amine group attached to a tertiary carbon atom. The beta-aminoalkanols preferably have boiling points below 175°C. Preferably, the boiling point is within 5°C of 165°C.

[0043] Such beta-aminoalkanols are excellent materials for hard surface cleaning in general and, in the present application, have certain desirable characteristics.

[0044] The beta-aminoalkanols are surprisingly better than, e.g., monoethanolamine for hard surface detergent compositions that contain perfume ingredients like terpenes and similar materials. However, normally the monoethanolamine is preferred for its effect in improving the filming/streaking performance of compositions containing zwitterionic detergent surfactant. The improvement in filming/streaking of hard surfaces that is achieved by combining the

monoethanolamine and/or beta-aminoalkanol was totally unexpected.

[0045] Good filming/streaking, i.e., minimal, or no, filming/streaking, is especially important for cleaning of, e.g., window glass or mirrors where vision is affected and for dishes and ceramic surfaces where spots are aesthetically undesirable. Beta-aminoalkanols provide superior cleaning of hard-to-remove greasy soils and superior product stability, especially under high temperature conditions, when used in hard surface cleaning compositions, especially those containing the zwitterionic detergent surfactants.

[0046] Beta-aminoalkanols, and especially the preferred 2-amino-2-methylpropanol, are surprisingly volatile from cleaned surfaces considering their relatively high molecular weights.

[0047] The compositions can contain, in addition to the preferred alkanolamines, more conventional alkaline buffers such as ammonia; other C₂₋₄ alkanolamines; alkali metal hydroxides; silicates; borates; carbonates; and/or bicarbonates. Thus, the buffers that are present comprise the monoethanolamine and/or beta-aminoalkanol and additional conventional alkaline material. The total amount of alkalinity source is typically from 0.05 to 5%, preferably up to 0.5%, to give a pH in the product, at least initially, in use of from 9 to 12, preferably from 9.5 to 11.5, more preferably from 9.5 to 11.3. pH is usually measured on the product.

(D) SUBSTANTIVE MATERIAL THAT INCREASES HYDROPHILICITY OF GLASS

[0048] An essential part of this invention is the substantive material that improves the hydrophilicity of the surface being treated, especially glass. This increase in hydrophilicity provides improved appearance when the surface is rewetted and then dried. The water "sheets" off the surface and thereby minimizes the formation of, e.g., "rainspots" that form upon drying. Materials which can provide this benefit, are polymers that contain sulfonate and/or carboxylate groups.

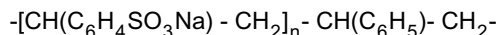
[0049] The polycarboxylate polymers are those formed by polymerization of monomers, at least some of these monomers contain carboxylic functionality. Common monomers include acrylic acid, maleic acid, ethylene, vinyl pyrrolidone, methacrylic acid, methacryloyl ethyl betaine. Polymers for substantivity are those having higher molecular weights. For example, polyacrylic acid having molecular weights below 10,000 are not particularly substantive and therefore do not normally provide hydrophilicity for three rewettings with all compositions.

[0050] The polymers should have molecular weights of at least 10,000, typically more than 10,000, preferably more than 20,000, more preferably more than 300,000, and even more preferably more than 400,000. It has also been found that higher molecular weight polymers, e.g., those having molecular weights of more than 3,000,000, are extremely difficult to formulate and are less effective in providing anti-spotting benefits than lower molecular weight polymers. Accordingly, the molecular weight should normally be, especially for polyacrylates, from 20,000 to 3,000,000; preferably from 20,000 to 2,500,000; more preferably from 300,000 to 2,000,000; and even more preferably from 400,000 to 1,500,000.

[0051] An advantage for some polycarboxylate polymers is the detergent builder effectiveness of such polymers. Surprisingly, such polymers do not hurt filming/streaking and like other detergent builders, they provide increased cleaning effectiveness on typical, common "hard-to-remove" soils that contain particulate matter.

[0052] Some polymers, especially polycarboxylate polymers, thicken the compositions that are aqueous liquids. This can be desirable. However, when the compositions are placed in containers with trigger spray devices, the compositions are desirably not so thick as to require excessive trigger pressure. Typically, the viscosity under shear should be less than 200 cp, preferably less than 100 cp, more preferably less than 50 cp. It can be desirable, however, to have thick compositions to inhibit the flow of the composition off the surface, especially vertical surfaces.

[0053] Other suitable materials include high molecular weight sulfonated polymers such as sulfonated polystyrene. A typical formula is as follows.



wherein n is a number to give the appropriate molecular weight as disclosed below.

[0054] Molecular weights are from 10,000 to 1,000,000, preferably from 200,000 to 700,000.

[0055] Examples of suitable materials for use herein include poly(vinyl pyrrolidone/acrylic acid) sold under the name "Acrylidone"® by ISP and poly(acrylic acid) sold under the name "Accumer"® by Rohm & Hass. Other suitable materials include sulfonated polystyrene polymers sold under the name Versaflex® sold by National Starch and Chemical Company, especially Versaflex 7000.

[0056] The level of substantive material should normally be from 0.01% to 10%, preferably from 0.05% to 0.5%, more preferably from 0.1% to 0.3%. In general, lower molecular weight materials such as lower molecular weight poly(acrylic acid), e.g., those having molecular weights below 10,000, and especially 2,000, do not provide good anti-spotting benefits upon rewetting, especially at the lower levels, e.g., 0.02%.

(E) AQUEOUS SOLVENT SYSTEM

[0057] The balance of the formula is typically water and non-aqueous polar solvents with only minimal cleaning action like methanol, ethanol, isopropanol, ethylene glycol, glycol ethers having a hydrogen bonding parameter of greater than 7.7, propylene glycol, and mixtures thereof, preferably isopropanol. The level of non-aqueous polar solvent is usually greater when more concentrated formulas are prepared. Typically, the level of non-aqueous polar solvent is from 0.5% to 40%, preferably from 1% to 10%, more preferably from 2% to 8% (especially for "dilute" compositions) and the level of water is from 50% to 99%, preferably from 75% to 95%.

(F) OPTIONAL INGREDIENTS

[0058] The compositions herein can also contain other various adjuncts which are known to the art for detergent compositions. Preferably they are not used at levels that cause unacceptable filming/streaking. Non-limiting examples of such adjuncts are:

Enzymes such as proteases;

[0059] Hydrotropes such as sodium toluene sulfonate, sodium cumene sulfonate and potassium xylene sulfonate; and

[0060] Aesthetic-enhancing ingredients such as colorants and perfumes, providing they do not adversely impact on filming/streaking in the cleaning of glass. Most hard surface cleaner products contain some perfume to provide an olfactory aesthetic benefit and to cover any "chemical" odor that the product may have. The main function of a small fraction of the highly volatile, low boiling (having low boiling points), perfume components in these perfumes is to improve the fragrance odor of the product itself, rather than impacting on the subsequent odor of the surface being cleaned. However, some of the less volatile, high boiling perfume ingredients can provide a fresh and clean impression to the surfaces, and it is sometimes desirable that these ingredients be deposited and present on the dry surface. The perfumes are preferably those that are more water-soluble and/or volatile to minimize streaking and filming. The perfumes useful herein are described in more detail in U.S. Patent 5,108,660, Michael, issued April 28, 1992, at col 8 lines 48 to 68, and col. 9 lines 1 to 68, and col. 10 lines 1 to 24, said patent.

[0061] Antibacterial agents can be present, but preferably only at low levels to avoid filming/streaking problems. More hydrophobic antibacterial/germicidal agents, like orthobenzyl-para-chlorophenol, are avoided. If present, such materials should be kept at levels below 0.1%.

[0062] Stabilizing ingredients can be present typically to stabilize more of the hydrophobic ingredients, e.g., perfume. The stabilizing ingredients include acetic acid and propionic acids, and their salts, e.g., NH_4 , MEA, Na, K, etc., preferably acetic acid and the $\text{C}_2\text{-C}_6$ alkane diols, more preferably butane diol. The stabilizing ingredients do not function in accordance with any known principle. Nonetheless, the combination of amido zwitterionic detergent surfactant with linear acyl amphocarboxylate detergent surfactant, anionic detergent surfactant, nonionic detergent surfactant, or mixtures thereof, and stabilizing ingredient can create a microemulsion. The amount of stabilizing ingredient is typically from 0.01% to 0.5%, preferably from 0.02% to 0.2%. The ratio of hydrophobic material, e.g., perfume that can be stabilized in the product is related to the total surfactant and typically is in an amount that provides a ratio of surfactant to hydrophobic material of from 1:2 to 2:1.

[0063] Other detergent builders that are efficient for hard surface cleaners and have reduced filming/streaking characteristics at the critical levels can also be present in the compositions of the invention. Addition of specific detergent builders at critical levels to the present composition further improves cleaning without the problem of filming/streaking that usually occurs when detergent builders are added to hard surface cleaners. There is no need to make a compromise between improved cleaning and acceptable filming/streaking results, which is especially important for hard surface cleaners which are also directed at cleaning glass. These compositions containing these specific additional detergent builders have exceptionally good cleaning properties. They also have exceptionally good "shine properties, i.e., when used to clean glossy surfaces, without rinsing, they have much less tendency than, e.g., carbonate built products to leave a dull finish on the surface and filming/streaking.

[0064] Suitable additional optional detergent builders include salts of ethylenediaminetetraacetic acid (hereinafter EDTA), citric acid, nitrilotriacetic acid (hereinafter NTA), sodium carboxymethylsuccinic acid, sodium N-(2-hydroxypropyl)-iminodiacetic acid, and N-diethyleneglycol-N,N-diacetic acid (hereinafter DIDA). The salts are preferably compatible and include ammonium, sodium, potassium and/or alkanolammonium salts. The alkanolammonium salt is preferred as described hereinafter. A preferred detergent builder is NTA (e.g., sodium), a more preferred builder is citrate (e.g., sodium or monoethanolamine), and a most preferred builder is EDTA (e.g., sodium).

[0065] These additional optional detergent builders, when present, are typically at levels of from 0.05% to 0.5%, more preferably from 0.05% to 0.3%, most preferably from 0.05% to 0.15%. The levels of these additional builders

present in the wash solution used for glass should be less than 0.2%. Therefore, typically, dilution is highly preferred for cleaning glass, while full strength is preferred for general purpose cleaning, depending on the concentration of the product.

[0066] Typically the best filming/streaking results occurs most when the builder is combined with amphoteric and/or zwitterionic detergent surfactant compositions although an improvement is also seen with the less preferred anionic or anionic/nonionic detergent surfactant compositions.

[0067] The invention is illustrated by the following nonlimiting Examples.

Filming/Streaking Stress Test

Procedure:

[0068] A paper towel is folded into eighths. Two milliliters of test product are applied to the upper half of the folded paper towel. The wetted towel is applied in one motion with even pressure from top to bottom of a previously cleaned window or mirror. The window or mirror with the applied product(s) is allowed to dry for ten minutes before grading by expert judges. After initial grading, the residues are then buffed with a dry paper towel with a uniform, consistent motion. The buffed residues are then graded by expert judges.

Grading:

[0069] Expert judges are employed to evaluate the specific areas of product application for amount of filming/streaking. A numerical value describing the amount of filming/streaking is assigned to each product. For the test results reported here a 0-6 scale is used.

0 = No Filming/Streaking

6 = Poor Filming/Streaking Room temperature and humidity have been shown to influence filming/streaking. Therefore, these variables are always recorded.

EXAMPLE I

Formula No. (Wt. %)

<u>Ingredient</u>	1	2	3*	4	5
IPA ¹	2.0	2.0	2.0	2.0	2.0
BP ²	2.0	2.0	2.0	2.0	2.0
MEA ³	0.25	0.25	0.25	0.25	0.25
Cocoamidopropyl-hydroxy-sultaine	0.1	0.1	0.1	0.1	0.1
Capryloamido(carboxy-methoxyethyl)glycinate	0.05	0.05	0.05	0.05	0.05
Polymer Additive	0.0	0.2 ⁴	0.2 ⁵	0.2 ⁶	0.2 ⁷
Soft Water to Balance	↔=====BALANCE=====↔				

¹Isopropanol

²Butoxypropanol

³Monoethanolamine

⁴Vinyl pyrrolidone/acrylic acid copolymer (MW about 250,000)

⁵Sodium Polyacrylate (MW about 2,000) * outside the claimed range

⁶Sodium Polyacrylate (MW about 450,000)

⁷Sodium Polyacrylate (MW about 3,000,000)

Filming/Streaking Stress Test on Glass Windows (Four Replications at 22°C and 62% Relative Humidity)	
Formula No.	Rating
1	1.0
2	0.5
3	0.8
4	1.2
5	2.8

The least significant difference between mean ratings is 1.1 at the 95% confidence level.

[0070] The above shows that the addition of the indicated polymers at the desired levels does not cause unacceptable filming/streaking results until the polymer molecular weight is about 3,000,000, and in some cases the polymer actually improves filming/streaking results.

[0071] The following test is used to evaluate the compositions' cleaning performance.

Preparation of Soiled Panels

[0072] Enamel splash panels are selected and cleaned with a mild, light duty liquid cleanser, then cleaned with isopropanol, and rinsed with distilled or deionized water. Greasy-particulate soil is weighed (2.0 grams) and placed on a sheet of aluminum foil. The greasy-particulate soil is a mixture of about 77.8% commercial vegetable oils and about 22.2% particulate soil composed of humus, fine cement, clay, ferrous oxide, and carbon black. The soil is spread out with a spatula and rolled to uniformity with a small roller. The uniform soil is then rolled onto the clean enamel plates until an even coating is achieved. The panels are then equilibrated in air and then placed in a preheated oven and baked at 140°C for 45-60 minutes. Panels are allowed to cool to room temperature and can either be used immediately, or aged for one or more days. The aging produces a tougher soil that typically requires more cleaning effort to remove.

Soil Removal

[0073] A Gardner Straight Line Washability Machine is used to perform the soil removal. The machine is fitted with a carriage which holds the weighted cleaning implement. The cleaning implements used for this test were clean cut sponges. Excess water is wrung out from the sponge and 5.0 grams of product are uniformly applied to one surface of the sponge. The sponge is fitted into the carriage on the Gardner machine and the cleaning test is run.

[0074] The average number of Gardner machine strokes necessary to achieve 95-99% removal of soil are obtained.

Formula No.	Average Number of Strokes
1	68
2	14.7
3	13.7
4	14
5	13.7

*Two replicates, greasy-particulate soil.

[0075] The above shows the cleaning improvement when a polycarboxylate polymer is added to the composition.

[0076] The least significant difference is 7.6 strokes at the 95% confidence level.

[0077] The following test is used to determine the lasting effects of preventing filming/streaking upon rewetting.

[0078] The windows, or mirrors, from the Filming/Streaking Test are rewetted by spraying with water containing about 0.02% household dust to simulate rain and dried, and this cycle is repeated twice more for a total of three cycles. The windows, or mirrors, are graded while wet using a scale in which 0 = No Sheeting and 6 = Heavy Sheeting. The sheeting is indicative of the hydrophilicity and the resulting lack of spotting/filming when dry.

Formula No.	Average Sheeting Grade
1	1.5
2	5

(continued)

Formula No.	Average Sheeting Grade
3	4.5
4	5.5
5	3.5

[0079] The above demonstrates the benefit of the polymers, when used at this level, in providing the sheeting (anti-spotting/filming) benefit upon rewetting.

EXAMPLE II**Formula No. (Wt.%)**

Ingredient	1	2 *	3
IPA	4.0	4.0	4.0
Ethylene Glycol Monobutyl Ether	2.5	2.5	2.5
Sodium Lauryl Sulfate	0.1	0.1	0.1
FC-129 Fluorosurfactant	0.06	0.06	0.06
Sodium Polyacrylate	---	0.2 ⁸	0.2 ⁹
Ammonia	0.16	0.16	0.16
Deionized (DI)			
Water to Balance	←=====BALANCE=====→		

⁸Sodium Polyacrylate (MW 2,000) * outside the claimed range

⁹Sodium Polyacrylate (MW 450,000)

[0080] The above formulas are tested as in the above test for sheeting, but the samples are dried and graded for "rainspots" using the grading scale of the Filming/Streaking Test.

Formula No.	Average "Rainspot" Grade
1	1.5
2	2.2
3	0.3

[0081] The above shows that the polymers work with other kinds of formulas that have good filming/streaking performance, but that the lower molecular weight polymers do not always deposit sufficiently to provide the rainspot benefit. It is believed that compositions containing amphoteric and/or zwitterionic detergent surfactants provide superior performance in this regard even when the molecular weight is below about 10,000.

EXAMPLE III

<u>Ingredient</u>	<u>Formula No. (Wt.%)</u>		
	1	2	3
IPA	3.0	3.0	3.0
Ethylene Glycol Monohexyl Ether	0.75	0.75	0.75
Sodium Dodecylbenzenesulfonate	0.25	0.25	0.25
Perfume	0.02	0.02	0.2
Sodium Polyacrylate (MW450,000)	---	0.2	0.02
Ammonia	0.15	0.15	0.15
Deionized (DI)			
Water to Balance	←=====BALANCE=====→		

[0082] The above formulas are tested as in the above test for sheeting, but for only two cycles and the glass samples were previously treated with the same composition with a lower level (about 0.02%) of polyacrylate (Formula 3) which did not give a significant benefit. Also, the samples are "dry buffed" after the surface is dried in the initial treatment, since without dry buffing the glass does not have good filming/streaking grades. The samples are dried and graded as in the Filming/Streaking Test. The results show that higher levels of higher molecular weight polymers are needed for good spotting and/or filming upon rewetting.

Formula No.	Average "Rainspot" Grade
1	2.2
2	0.0
3	1.8

EXAMPLE IV

<u>Ingredient</u>	<u>Formula No. (Wt.%)</u>		
	1	2	3
Ethanol	2.8	2.8	2.8
Ethylene Glycol Monobutyl Ether	2.8	2.8	2.8
Sodium Alkyl (C ₈ , C ₁₂ , and C ₁₄) Sulfate	0.2	0.2	0.2
Versaflex 7000 ®	---	---	0.1
Versaflex 2004 ®	---	0.1	---
Polymer ⁴	0.1	---	---
Perfume, NaOH (pH 9.5), and Soft			

Water to Balance ←=====BALANCE=====→

Versaflex 2004 and 7000 are sodium sulfonated polystyrenes from National Starch and Chemical Company.

⁴Vinyl pyrrolidone/acrylic acid copolymer (MW about 250,000)

[0083] The above formulas are tested for 3 cycles as in the above test for sheeting, but the samples are dried and graded for "rainspots" using the grading scale of the Filming/Streaking Test.

Formula No.	Average "Rainspot" Grade
1	1.0
2	2.6
3	1.1

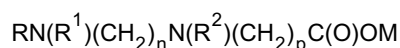
[0084] The above shows that the sulfonated styrene polymers work as well as the polyacrylates that have good filming/streaking performance, but that the lower molecular weight polymers do not always deposit sufficiently to provide the rainspot benefit.

[0085] Examples II - IV are outside the claimed range.

Claims

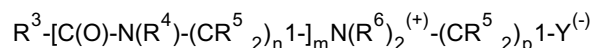
1. An aqueous, liquid, hard surface detergent composition having improved cleaning and good filming/streaking characteristics after rewetting and comprising: (A) detergent surfactant selected from the group consisting of:

(1) from 0.001% to 1% detergent surfactant having the generic formula :



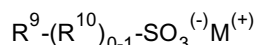
wherein R is a C₆-C₁₀ hydrophobic moiety, including fatty acyl moiety containing from 6 to 10 carbon atoms which in combination with the nitrogen atom forms an amido group, R¹ is hydrogen or a C₁₋₂ alkyl group, R² is a C₁₋₂ alkyl, carboxymethoxy ethyl, or hydroxy ethyl, each n is an integer from 1 to 3, each p is an integer from 1 to 2 and M is a water soluble cation selected from alkali metal, ammonium, alkanolammonium, and mixtures thereof cations;

(2) from 0.02% to 5%, detergent surfactant having the generic formula:



wherein each R³ is an alkyl, or alkylene, group containing from 10 to 18 carbon atoms, each (R⁴) and (R⁶) is selected from the group consisting of hydrogen, methyl, ethyl, propyl, hydroxy substituted ethyl or propyl and mixtures thereof, each (R⁵) is selected from the group consisting of hydrogen and hydroxy groups, with no more than one hydroxy group in any (CR⁵₂)_p¹ moiety; m is 0 or 1; each n¹ and p¹ is a number from 1 to 4; and Y is a carboxylate or sulfonate group, and

(3) from 0.01% to 1.0% detergent surfactant having the generic formula:



wherein R⁹ is a C₆-C₂₀ alkyl chain; R¹⁰ is a C₆-C₂₀ alkylene chain, a C₆H₄ phenylene group, or O; and M is the same as before; and

(4) mixtures thereof

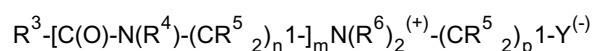
(B) hydrophobic solvent, (C) from 0.05% to 10% buffer-alkalinity-source comprising alkanolamine selected from the group consisting of monoethanolamine, beta-amino-alkanol, containing from three to six carbons, and mixtures thereof, to provide a pH of from 9.0 to 12; (D) substantive polymer selected from the group consisting, of polycarboxylate polymer, having a molecular weight of from 10 000 to 3,000,000 and sulfonated polystyrene polymer having a molecular weight of from 10 000 to 1 000 000, said substantive polymer not being a maleic acid-olefin copolymer; and (E) the balance being an aqueous solvent system comprising water and, optionally, non-aqueous polar solvent with only minimal cleaning action selected from the group consisting of methanol, ethanol, isopropanol, ethylene glycol, polypropylene glycol, glycol ethers having a hydrogen bonding parameter of greater than 7.7, and mixtures thereof and any minor ingredients.

2. A composition according to claim 1, wherein the detergent surfactant A(2) is present at a level of from 0.02% to

0.2%.

3. A composition according to any of the preceding claims comprising detergent surfactant A(2) wherein Y is a sulfonate group, said R³ group contains from 12 to 16 carbon atoms, each R⁶ is methyl, and p is 3.
4. A composition according to any of the preceding claims wherein said hydrophobic solvent is present at a level of from 2% to 15%, preferably said hydrophobic solvent having a hydrogen bonding parameter of from about 2 to about 7.7, more preferably wherein said hydrophobic solvent is selected from the group consisting of monopropyleneglycolmonopropyl ether, dipropyleneglycolmonobutyl ether, monopropyleneglycolmonobutyl ether, ethyleneglycolmonoheptyl ether, ethyleneglycolmonobutyl ether, diethyleneglycolmonoheptyl ether, monoethyleneglycolmonobutyl ether, and mixtures thereof, and even more preferably, wherein said hydrophobic solvent is monopropyleneglycolmonobutyl ether.
5. A composition according to any of the preceding claims, wherein said buffer-alkalinity-source comprises monoethanolamine.
6. A composition according to any of the preceding claims, wherein said substantive polymer is present at a level of from 0.01% to 10%, preferably from 0.05% to 0.5%, and more preferably from 0.1% to 0.3%.
7. A composition according to any of the preceding claims, wherein said substantive polymer comprises polycarboxylate polymer having a molecular weight from 10.000 to 2.500.000, preferably from 20.000 to 2.500.000 and more preferably from 300.000 to 2.000.000 and even more preferably from 400.000 to 1.500.000.
8. An aqueous liquid hard surface detergent composition according to any of the preceding claims having excellent filming/streaking characteristics comprising (A)(4) wherein the primary surfactant is (A)(1), (A)(2), or mixtures thereof containing at least one cosurfactant selected from the group consisting of anionic detergent surfactants, nonionic detergent surfactants, and mixtures thereof, preferably anionic detergent selected from the group consisting of C₁₂-C₁₈ alkyl sulfates C₁₂ - C₁₈ paraffin sulfonates, C₁₂-C₁₈ acylamidoalkylene sulfonates at a pH of more than 9.5, and mixtures thereof.
9. The composition of Claim 8 wherein said cosurfactant is a nonionic detergent selected from the group consisting of alkoxyated alcohols and alkyl phenol ethoxylates.
10. The composition of Claim 8 comprising (A)(4) wherein (A)(2) is present at a level of from 0.02% to 0.2% and preferably, (A)(4) comprises (A)(1) and (A)(2) in a ratio of from 3:1 to 1:3, more preferably from 2:1 to 1:2.
11. The composition of any of the preceding Claims comprising A(1) wherein n is 2 and p is 1.
12. The aqueous, liquid hard surface detergent composition of any of the preceding Claims comprising:

(A) from 0.02% to 5% detergent surfactant having the generic formula:



wherein each R³ is an alkyl, or alkylene, group containing from 10 to 18 carbon atoms, each (R⁴) and (R⁶) is selected from the group consisting of hydrogen, methyl, ethyl, propyl, hydroxy substituted ethyl or propyl and mixtures thereof each (R⁵) is selected from the group consisting of hydrogen and hydroxy groups with no more than one hydroxy group in any (CR⁵)₂ moiety; m is 0 or 1; each n¹ and p¹ is a number from 1 to 4; and Y is a carboxylate or sulfonate group, preferably wherein Y is a sulfonate group, said R³ group contains from 9 to 15 carbon atoms, each R⁶ is methyl, one of the R⁵ groups between the (+) and the (-) charge centers is a hydroxy group and the remaining R⁵ groups are hydrogen, and p is 3;

(B) from 0.5% to 30%, by weight of the composition, of a hydrophobic solvent, having a hydrogen bonding parameter of from 2 to 7.7, preferably selected from the group consisting of monopropyleneglycolmonopropyl ether, dipropyleneglycolmonobutyl ether, monopropyleneglycolmonobutyl ether, ethyleneglycolmonoheptyl ether, ethyleneglycolmonobutyl ether, diethyleneglycolmonoheptyl ether, monoethyleneglycolmonobutyl ether, and mixtures thereof, and even more preferably, monopropyleneglycolmonobutyl ether;

(C) from 0.05% to 10%, by weight of the composition, of alkanolamine selected from the group consisting of monoethanolamine, beta-amino-alkanol, containing from three to six carbons, and mixtures thereof, to give a pH of from 9.5 to 11.5;

(D) from 0.05% to 0.5% substantive polymer selected from the group consisting of polycarboxylate polymer that is substantive to glass; having a molecular weight of from 10 000 to 3 000 000 and sulfonated polystyrene polymer having a molecular weight of from 10 000 to 1 000 000; and

(E) the balance being an aqueous solvent system comprising water, said composition preferably containing at least one cosurfactant selected from the group consisting of anionic detergent surfactants, nonionic detergent surfactant, and mixtures thereof, the ratio of surfactant to cosurfactant being from 3:1 to 1:1, said cosurfactant preferably being selected from the group consisting of C₁₂-C₁₈ alkyl sulfates, C₁₂ - C₁₈ paraffin sulfonates, C₁₂-C₁₈ acylamidoalkylene sulfonates at a pH of more than 9.5, and mixtures thereof.

13. The composition of any of the preceding Claims additionally containing from 0.01% to 0.5% of detergent surfactant (A)(1).

14. The process of cleaning glass, that is subject to rewetting, with an effective amount of the composition of any of Claims 1-13 to provide a more hydrophilic surface, which minimizes the formation of spotting and/or filming when said surface is rewetting for at least 3 rewetting cycles.

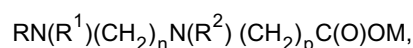
15. The use of a hard-surface detergent composition according to any of claims 1-13 whereby hydrophilicity is provided to the treated surface and thereby the formation of rain-spots is minimized.

Patentansprüche

1. Wäßrige, flüssige Detergenzzusammensetzung für harte Oberflächen, welche verbesserte Reinigungseigenschaften und gute Eigenschaften hinsichtlich der Filmbildung/Streifenbildung nach dem Wiederbefeuchten besitzen, und:

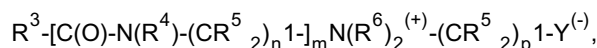
(A) ein grenzflächenaktives Detergenzmittel, ausgewählt von der Gruppe bestehend aus:

(1) 0,001% bis 1% eines grenzflächenaktiven Detergenzmittels der allgemeinen Formel:



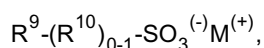
worin R ein hydrophober C₆-C₁₀-Rest, einschließlich eines Fettacylrestes mit 6 bis 10 Kohlenstoffatomen, ist, welcher in Verbindung mit dem Stickstoffatom eine Amidogruppe ausbildet, R¹ für Wasserstoff oder eine C₁₋₂-Alkylgruppe steht, R² ein C₁₋₂-Alkyl, Carboxymethoxyethyl oder hydroxyethyl darstellt, jedes n eine ganze Zahl von 1 bis 3 ist, jedes p eine ganze Zahl von 1 bis 2 darstellt und M ein wasserlösliches Kation bedeutet, welches unter Alkalimetall, Ammonium, Alkanolammonium und Gemischen dieser Kationen ausgewählt ist;

(2) 0,02% bis 5% eines grenzflächenaktiven Detergenzmittels der allgemeinen Formel:



worin jeder Rest R³ eine Alkyl- oder Alkylengruppe mit 10 bis 18 Kohlenstoffatomen darstellt, jeder Rest (R⁴) und (R⁶) von der Gruppe ausgewählt ist, welche aus Wasserstoff, Methyl, Ethyl, Propyl, Hydroxy-substituiertem Ethyl oder Propyl und Gemischen hiervon besteht, jeder Rest (R⁵) von der aus Wasserstoff und Hydroxygruppen bestehenden Gruppe ausgewählt ist, wobei nicht mehr als eine Hydroxygruppe in jedem (CR⁵₂)_p1-Rest vorhanden ist; m 0 oder 1 beträgt; jedes n¹ und p¹ eine Zahl von 1 bis 4 darstellt, und Y eine Carboxylat- oder Sulfonatgruppe bedeutet; und

(3) 0,01% bis 1,0% eines grenzflächenaktiven Detergenzmittels der allgemeinen Formel



worin R^9 eine C_6 - C_{20} -Alkylkette darstellt; R^{10} eine C_6 - C_{20} -Alkylenkette, eine C_6H_4 -Phenylengruppe oder O darstellt; und M die gleiche Bedeutung wie zuvor besitzt; und

(4) Gemischen hievon;

(B) ein hydrophobes Lösungsmittel; (C) 0,05% bis 10% einer Puffer-Alkalinitätsquelle, umfassend Alkanolamin, welches von der aus Monoethanolamin, β -Aminoalkanol, mit 3 bis 6 Kohlenstoffatomen, und Gemischen hievon bestehenden Gruppe ausgewählt ist, um einen pH-Wert von 9,0 bis 12 zu gewährleisten; (D) ein substantives Polymer, ausgewählt von der Gruppe bestehend aus Polycarboxylatpolymer mit einem Molekulargewicht von 10.000 bis 3.000.000 und sulfoniertem Polystyrolpolymer mit einem Molekulargewicht von 10.000 bis zu 1.000.000, welches substantive Polymer kein Maleinsäure-Olefin-Copolymer ist; und (E) als Rest ein wässriges Lösungsmittelsystem, welches Wasser und wahlweise ein nicht-wässriges, polares Lösungsmittel mit einer nur geringen Reinigungswirkung umfaßt, welches von der aus Methanol, Ethanol, Isopropanol, Ethylenglycol, Polypropylenglycol, Glycolethern mit einem Wasserstoffbindungsparameter von mehr als 7,7, und Gemischen hievon bestehenden Gruppe ausgewählt ist, und irgendwelche geringfügigen Bestandteile umfaßt.

2. Zusammensetzung nach Anspruch 1, worin das grenzflächenaktive Detergenzmittel (A) (2) in einer Menge von 0,02% bis 0,2% vorhanden ist.

3. Zusammensetzung nach einem der vorstehenden Ansprüche, welche ein grenzflächenaktives Detergenzmittel (A) (2) umfaßt, worin Y eine Sulfonatgruppe darstellt, die genannte R^3 -Gruppe 12 bis 16 Kohlenstoffatome aufweist, jeder Rest R^6 Methyl bedeutet und p 3 beträgt.

4. Zusammensetzung nach einem der vorstehenden Ansprüche, worin das genannte hydrophobe Lösungsmittel in einer Menge von 2% bis 15% vorhanden ist, vorzugsweise worin das genannte hydrophobe Lösungsmittel einen Wasserstoffbindungsparameter von etwa 2 bis etwa 7,7 besitzt, stärker bevorzugt worin das genannte hydrophobe Lösungsmittel von der Gruppe bestehend aus Monopropylenglycolmonopropylether, Dipropylenglycolmonobutylether, Monopropylenglycolmonobutylether, Ethylenglycolmonohexylether, Ethylenglycolmonobutylether, Diethylenglycolmonohexylether, Monoethylenglycolmonobutylether und Gemischen hievon ausgewählt ist, und noch stärker bevorzugt worin das genannte hydrophobe Lösungsmittel Monopropylenglycolmonobutylether ist.

5. Zusammensetzung nach einem der vorstehenden Ansprüche, worin die genannte Puffer-Alkalinitätsquelle Monoethanolamin umfaßt.

6. Zusammensetzung nach einem der vorstehenden Ansprüche, worin das genannte substantive Polymer in einer Menge von 0,01% bis 10%, vorzugsweise von 0,05% bis 0,5%, und stärker bevorzugt von 0,1% bis 0,3% vorhanden ist.

7. Zusammensetzung nach einem der vorstehenden Ansprüche, worin das genannte substantive Polymer Polycarboxylatpolymer mit einem Molekulargewicht von 10.000 bis 2.500.000, vorzugsweise von 20.000 bis 2.500.000 und stärker bevorzugt von 300.000 bis 2.000.000 und noch stärker bevorzugt von 400.000 bis 1.500.000 umfaßt.

8. Wässrige, flüssige Detergenzzusammensetzung für harte Oberflächen nach einem der vorstehenden Ansprüche, welche außerordentliche Eigenschaften hinsichtlich der Filmbildung/Streifenbildung besitzt, umfassend (A)(4), worin das primäre grenzflächenaktive Mittel von (A)(1), (A)(2) oder Gemischen hievon mit mindestens einem co-grenzflächenaktiven Mittel gebildet wird, welches von der Gruppe bestehend aus anionischen grenzflächenaktiven Detergenzmitteln, nichtionischen grenzflächenaktiven Detergenzmitteln und Gemischen hievon ausgewählt ist, vorzugsweise ein anionisches Detergenz ist, welches von der Gruppe bestehend aus C_{12} - C_{18} -Alkylsulfaten, C_{12} - C_{18} -Paraffinsulfonaten, C_{12} - C_{18} -Acylamidoalkylsulfonaten bei einem pH-Wert von mehr als 9,5, und Gemischen hievon ausgewählt ist.

9. Zusammensetzung nach Anspruch 8, worin das genannte co-grenzflächenaktive Mittel ein nichtionisches Detergenz ist, welches von der aus alkoxylierten Alkoholen und Alkylphenoethoxylaten bestehenden Gruppe ausge-

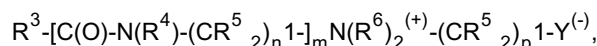
wählt ist.

10. Zusammensetzung nach Anspruch 8, umfassend (A)(4), worin (A) (2) in einer Menge von 0,02% bis 0,2% vorhanden ist und vorzugsweise worin (A)(4) (A)(1) und (A)(2) in einem Verhältnis von 3:1 bis 1:3, starker bevorzugt von 2:1 bis 1:2 umfaßt.

11. Zusammensetzung nach einem der vorstehenden Ansprüche, umfassend (A)(1), worin n 2 beträgt und p 1 ist.

12. Wäßrige, flüssige Detergenzzusammensetzung für harte Oberflächen nach einem der vorstehenden Ansprüche, umfassend:

(A) 0,02% bis 5% von einem grenzflächenaktiven Detergenzmittel der allgemeinen Formel:



worin jeder Rest R^3 eine Alkyl- oder Alkylengruppe mit 10 bis 18 Kohlenstoffatomen darstellt, jeder Rest (R^4) und (R^6) von der Gruppe ausgewählt ist, welche aus Wasserstoff, Methyl, Ethyl, Propyl, Hydroxy-substituiertem Ethyl oder Propyl und Gemischen hievon besteht, jeder Rest (R^5) von der aus Wasserstoff und Hydroxygruppen bestehenden Gruppe ausgewählt ist, wobei nicht mehr als eine hydroxygruppe in jedem $[CR^5_2]_p-1$ -Rest vorhanden ist; m 0 oder 1 beträgt; jedes n^1 und p^1 eine Zahl von 1 bis 4 darstellt, und Y eine Carboxylat- oder Sulfonatgruppe bedeutet, vorzugsweise worin Y eine Sulfonatgruppe ist, die genannte R^3 -Gruppe 9 bis 15 Kohlenstoffatome enthält, jeder Rest R^6 Methyl ist, eine der R^5 -Gruppen zwischen dem (+)-Ladungszentrum und dem (-)-Ladungszentrum eine hydroxygruppe ist und die verbleibenden R^5 -Gruppen Wasserstoff darstellen, und p für 3 steht;

(B) 0,5 Gew.-% bis 30 Gew.-% der Zusammensetzung von einem hydrophoben Lösungsmittel mit einem Wasserstoffbindungsparameter von 2 bis 7,7, welches Vorzugsweise von der Gruppe bestehend aus Monopropylenglycolmonopropylether, Dipropylenglycolmonobutylether, Monopropylenglycolmonobutylether, Ethylenglycolmonoheylether, Ethylenglycolmonobutylether, Diethylenglycolmonoheylether, Monoethylenglycolmonobutylether und Gemischen hievon ausgewählt ist, und noch stärker bevorzugt Monopropylenglycolmonobutylether ist;

(C) 0,05 Gew.-% bis 10 Gew.-% der Zusammensetzung von einem Alkanolamin, welches von der Gruppe bestehend aus Monoethanolamin, β -Aminoalkanol, mit 3 bis 6 Kohlenstoffatomen, und Gemischen hievon ausgewählt ist, um einen pH-Wert von 9,5 bis 11,5 zu ergeben:

(D) 0,05% bis 0,5% von einem substantiven Polymer, welches von der Gruppe bestehend aus Polycarboxylatpolymer, welches gegenüber Glas substantiv ist und ein Molekulargewicht von 10.000 bis 3.000.000 besitzt, und sulfoniertem Polystyrolpolymer mit einem Molekulargewicht von 10.000 bis 1.000.000 ausgewählt ist;

(E) als Rest ein wäßriges, Wasser-enthaltendes Lösungsmittelsystem umfaßt,

welche Zusammensetzung vorzugsweise mindestens ein co-grenzflächenaktives Mittel enthält, das von der Gruppe bestehend aus anionischen grenzflächenaktiven Detergenzmitteln, nichtionischen grenzflächenaktiven Detergenzmitteln, und Gemischen hievon ausgewählt ist, wobei das Verhältnis von grenzflächenaktivem Mittel zu co-grenzflächenaktivem Mittel von 3:1 bis 1:1 beträgt, welches co-grenzflächenaktive Mittel vorzugsweise von der Gruppe bestehend aus C_{12} - C_{18} -Alkylsulfaten, C_{12} - C_{18} -Paraffinsulfonaten, C_{12} - C_{18} -Acylamidoalkylensulfonaten bei einem pH-Wert von mehr als 9,5, und Gemischen hievon ausgewählt ist.

13. Zusammensetzung nach einem der vorstehenden Ansprüche, welche zusätzlich 0,01% bis 0,5% an grenzflächenaktivem Detergenzmittel (A)(1) umfaßt.

14. Verfahren zur Reinigung von Glas, welches einer Wiederbefeuchtung unterworfen ist, mit einer wirksamen Menge der Zusammensetzung nach einem der Ansprüche 1 bis 13, um eine hydrophilere Oberfläche zu gewährleisten, welche die Ausbildung von Flecken und/oder die Filmbildung minimiert, wenn die genannte Oberfläche während mindestens 3 Wiederbefeuchtungszyklen wiederbefeuchtet wird.

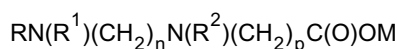
15. Verwendung einer Detergenzzusammensetzung für harte Oberflächen nach einem der Ansprüche 1 bis 13, wodurch die Hydrophilität für die behandelte Oberfläche gewährleistet wird und dadurch die Ausbildung von Regenflecken minimiert wird.

Revendications

1. Composition détergente liquide et aqueuse pour surfaces dures présentant des caractéristiques de nettoyage améliorées et de bonnes propriétés anti-film/anti-trainées après remouillage et contenant :

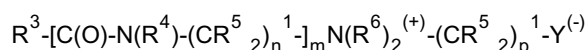
(A) un tensioactif détergent sélectionné parmi le groupe composé de :

(1) 0,001 % à 1 % d'un tensioactif détergent ayant la formule générale suivante :



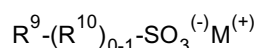
dans laquelle R est un groupement hydrophobe en C_6 à C_{10} , ayant un groupement acyle gras contenant 6 à 10 atomes de carbone qui, en combinaison avec l'atome d'azote forme un groupe amido, R^1 est un atome d'hydrogène ou un groupe alkyle en C_1 à C_2 , R^2 est un groupe alkyle en C_1 à C_2 , un groupe carboxyméthoxyéthyle ou hydroxyéthyle, chaque n est un entier de 1 à 3, chaque p est un entier de 1 à 2 et M est un cation soluble dans l'eau sélectionné parmi des cations métal alcalin, ammonium, alcanolammonium et des mélanges de ces cations ;

(2) 0,02 % à 5 % d'un tensioactif détergent ayant la formule générale suivante :



dans laquelle chaque R^3 est un groupe alkyle ou alkylène contenant 10 à 18 atomes de carbone, chaque (R^4) et (R^6) est sélectionné parmi le groupe composé d'un atome d'hydrogène, d'un méthyle, d'un éthyle, d'un propyle, d'un éthyle ou propyle substitué par un hydroxy et de mélanges de ceux-ci, chaque (R^5) est sélectionné parmi le groupe composé d'un atome d'hydrogène et de groupes hydroxy, avec pas plus d'un groupe hydroxy dans chaque groupement $(\text{CR}^5_2)_p^1$; m vaut 0 ou 1 ; chaque n^1 et p^1 est un nombre entre 1 et 4 ; et Y est un groupe carboxylate ou sulfonate ; et

(3) 0,01 % à 1,0 % d'un tensioactif détergent ayant la formule générale suivante :



dans laquelle R^9 est une chaîne alkyle en C_6 à C_{20} ; R^{10} est une chaîne alkylène en C_6 à C_{20} , un groupe phénylène C_6H_4 ou O ; et M est identique à ce qui précède ; et

(4) des mélanges de ceux-ci ;

(B) un solvant hydrophobe ;

(C) 0,05 % à 10 % d'une source d'alcalinité tampon comprenant une alcanolamine sélectionnée parmi le groupe composé de la monoéthanolamine, d'un β -amino-alcanol contenant trois à six atomes de carbone et de mélanges de ceux-ci, pour obtenir un pH de 9,0 à 12 ;

(D) un polymère substantif sélectionné parmi le groupe composé d'un polymère de polycarboxylate présentant une masse moléculaire de 10 000 à 3 000 000 et d'un polymère de polystyrène sulfoné présentant une masse moléculaire de 10 000 à 1 000 000, ledit polymère substantif n'étant pas un copolymère acide maléique-oléfine ; et

(E) le complément étant un système de solvant aqueux contenant de l'eau et éventuellement un solvant polaire non aqueux n'ayant qu'un pouvoir nettoyant minimal, sélectionné parmi le groupe composé du méthanol, de l'éthanol, de l'isopropanol, de l'éthylène glycol, du polypropylène glycol, des éthers glycoliques ayant un paramètre de liaison hydrogène supérieur à 7,7, et de mélanges de ceux-ci, ainsi que des ingrédients mineurs quelconques.

2. Composition selon la revendication 1, dans laquelle le tensioactif détergent (A)(2) est présent dans une proportion

de 0,02 % à 0,2 %.

3. Composition selon l'une quelconque des revendications précédentes, contenant un tensioactif détergent (A)(2) dans lequel Y est un groupe sulfonate, ledit groupe R³ contient 12 à 16 atomes de carbone, chaque R⁶ est un groupe méthyle et p vaut 3.

4. Composition selon l'une quelconque des revendications précédentes, dans laquelle ledit solvant hydrophobe est présent dans une proportion de 2 % à 15 %, de préférence ledit solvant hydrophobe ayant un paramètre de liaison hydrogène d'environ 2 à environ 7,7, de façon plus préférentielle dans laquelle ledit solvant hydrophobe est sélectionné parmi le groupe composé d'éther monopropylique de monopropylèneglycol, d'éther monobutylique de dipropylèneglycol, d'éther monobutylique de monopropylèneglycol, d'éther monohexylique d'éthylèneglycol, d'éther monobutylique d'éthylèneglycol, d'éther monohexylique de diéthylèneglycol, d'éther monobutylique de monoéthylèneglycol et de mélanges de ceux-ci, et de façon encore plus préférentielle dans laquelle ledit solvant hydrophobe est l'éther monobutylique de monopropylèneglycol.

5. Composition selon l'une quelconque des revendications précédentes, dans laquelle ladite source d'alcalinité tampon comprend de la monoéthanolamine.

6. Composition selon l'une quelconque des revendications précédentes, dans laquelle ledit polymère substantif est présent dans une proportion de 0,01 % à 10 %, de préférence de 0,05 % à 0,5 %, et de façon plus préférentielle de 0,1 % à 0,3 %.

7. Composition selon l'une quelconque des revendications précédentes, dans laquelle ledit polymère substantif comprend un polymère de polycarboxylate présentant une masse moléculaire de 10 000 à 2 500 000, de préférence de 20 000 à 2 500 000 et de façon plus préférentielle de 300 000 à 2 000 000, et de façon encore plus préférentielle, de 400 000 à 1 500 000.

8. Composition détergente liquide et aqueuse pour surfaces dures selon l'une quelconque des revendications précédentes présentant d'excellentes caractéristiques anti-film/anti-traînées contenant (A)(4), dans laquelle le tensioactif primaire est (A)(1), (A)(2) ou des mélanges de ceux-ci, contenant au moins un co-tensioactif sélectionné parmi le groupe composé de tensioactifs détergents anioniques, de tensioactifs détergents non ioniques et de mélanges de ceux-ci, de préférence un détergent anionique sélectionné parmi le groupe composé d'alkylsulfates en C₁₂ à C₁₈, de paraffinesulfonates en C₁₂ à C₁₈, d'acylamidoalkylènesulfonates en C₁₂ à C₁₈ à un pH supérieur à 9,5 et de mélanges de ceux-ci.

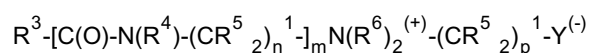
9. Composition selon la revendication 8, dans laquelle ledit co-tensioactif est un détergent non ionique sélectionné parmi le groupe composé d'alcools alcoylés et d'éthoxylates d'alkylphénol.

10. Composition selon la revendication 8 contenant (A)(4), dans laquelle (A)(2) est présent dans une proportion de 0,02 % à 0,2 % et de préférence (A)(4) comprend (A)(1) et (A)(2) dans un rapport de 3:1 à 1:3, de façon plus préférentielle de 2:1 à 1:2.

11. Composition selon l'une quelconque des revendications précédentes contenant (A)(1), dans laquelle n vaut 2 et p vaut 1.

12. Composition détergente liquide et aqueuse pour surfaces dures selon l'une quelconque des revendications précédentes, comprenant :

(A) 0,02 % à 5 % d'un tensioactif détergent ayant la formule générale suivante :



dans laquelle chaque R³ est un groupe alkyle ou alkylène contenant 10 à 18 atomes de carbone, chaque (R⁴) et (R⁶) est sélectionné parmi le groupe composé d'un atome d'hydrogène, d'un méthyle, d'un éthyle, d'un propyle, d'un éthyle ou propyle substitué par un hydroxy et de mélanges de ceux-ci, chaque (R⁵) est sélectionné parmi le groupe composé d'un atome d'hydrogène et de groupes hydroxy, avec pas plus d'un groupe hydroxy dans chaque groupement (CR⁵₂)_p¹ ; m vaut 0 ou 1 ; chaque n¹ et p¹ est un nombre de 1 à 4 ; et Y

est un groupe carboxylate ou sulfonate, de préférence dans laquelle Y est un groupe sulfonate, ledit groupe R³ contient 9 à 15 atomes de carbone, chaque R⁶ est un groupe méthyle, l'un des groupes R⁵ entre les centres de charge (+) et (-) est un groupe hydroxy et les groupes R⁵ restants sont un atome d'hydrogène et p vaut 3 ;

(B) 0.5 % à 30 % en poids de la composition d'un solvant hydrophobe ayant un paramètre de liaison hydrogène entre 2 et 7,7, de préférence sélectionné parmi le groupe composé d'éther monopropylique de monopropylèneglycol, d'éther monobutylique de dipropylèneglycol, d'éther monobutylique de monopropylèneglycol, d'éther monohexylique d'éthylèneglycol, d'éther monobutylique d'éthylèneglycol, d'éther monohexylique de diéthylèneglycol, d'éther monobutylique de monoéthylèneglycol et de mélanges de ceux-ci, et de façon encore plus préférentielle d'éther monobutylique de monopropylèneglycol ;

(C) 0.5 % à 10 % en poids de la composition d'une alcanolamine sélectionnée parmi le groupe composé de la monoéthanolamine, d'un β-amino-alcanol contenant trois à six atomes de carbone et de mélanges de ceux-ci, pour obtenir un pH de 9,5 à 1,5 ;

(D) 0,05 % à 0,5 % d'un polymère substantif sélectionné parmi le groupe composé d'un polymère de polycarboxylate qui est substantif par rapport au verre et qui présente une masse moléculaire de 10 000 à 3 000 000 et d'un polymère de polystyrène sulfoné qui présente une masse moléculaire de 10 000 à 1 000 000 ;

(E) le complément étant un système de solvant aqueux contenant de l'eau, ladite composition contenant de préférence au moins un co-tensioactif sélectionné parmi le groupe composé de tensioactifs détergents anioniques, de tensioactifs détergents non ioniques et de mélanges de ceux-ci, le rapport entre tensioactif et co-tensioactif étant de 3:1 à 1:1, ledit co-tensioactif étant de préférence sélectionné parmi le groupe composé d'alkylsulfates en C₁₂ à C₁₈, de paraffinesulfonates en C₁₂ à C₁₈, d'acylamidoalkylènesulfonates en C₁₂ à C₁₈ à un pH supérieur à 9,5 et de mélanges de ceux-ci.

13. Composition selon l'une quelconque des revendications précédentes, qui contient en outre le tensioactif détergent (A)(1) dans une proportion de 0,01 % à 0,5 %.

14. Procédé de nettoyage du verre qui est soumis à un remouillage avec une quantité efficace de la composition selon l'une quelconque des revendications 1 à 13, pour obtenir une surface plus hydrophile qui minimise la formation de taches et/ou de films lorsque ladite surface est remouillée pendant au moins 3 cycles de remouillage.

15. Utilisation d'une composition détergente pour surfaces dures selon l'une quelconque des revendications 1 à 13, dans laquelle un caractère hydrophile est conféré à la surface traitée, ce qui permet de minimiser la formation de taches de gouttes d'eau.